Articulations

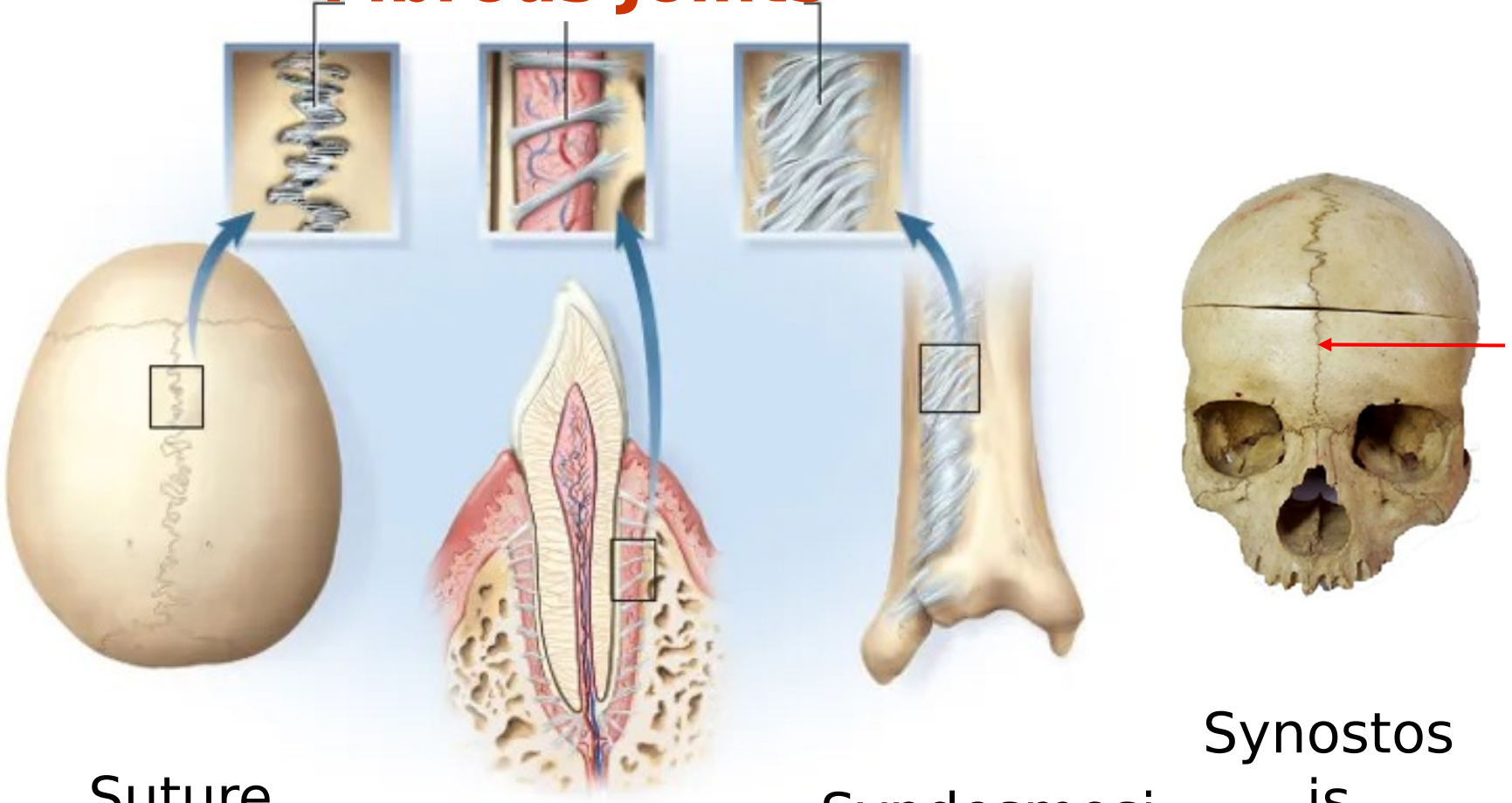
Bone-bone; Bone-cartilage; Bone-teeth

Structural Classification of Articulations

The structural material that brings bones together.

1. **Fibrous** – bones brought together by fibers.
2. **Cartilaginous** – bones brought together by cartilage.
3. **Synovial** – bones joined by an enclosed fluid filled cavity.

Fibrous Joints



Suture

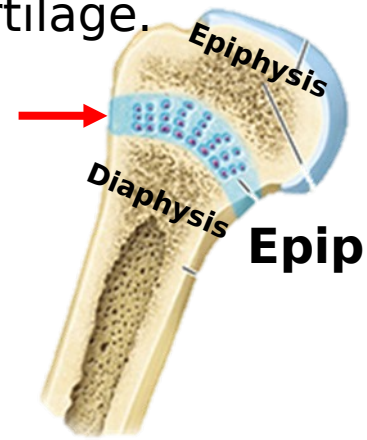
Gompho
sis

Syndesmosi
s

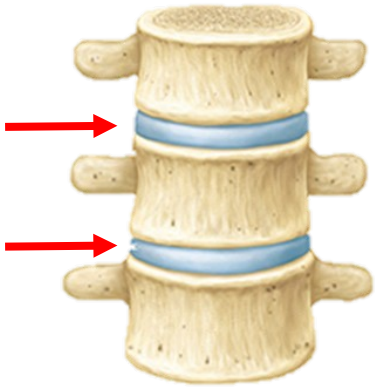
Synostos
is

Cartilaginous Joints

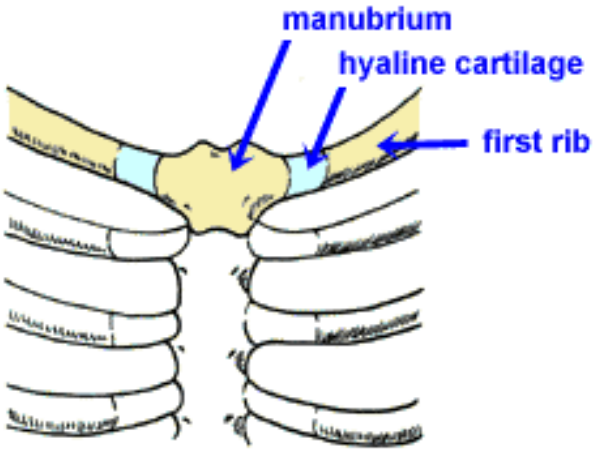
Synchondrosis – joined by hyaline cartilage.



Epiphyseal plate

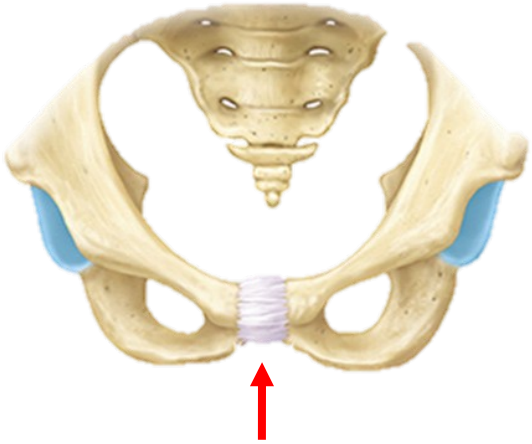


intervertebral joints



1st sternocostal joint

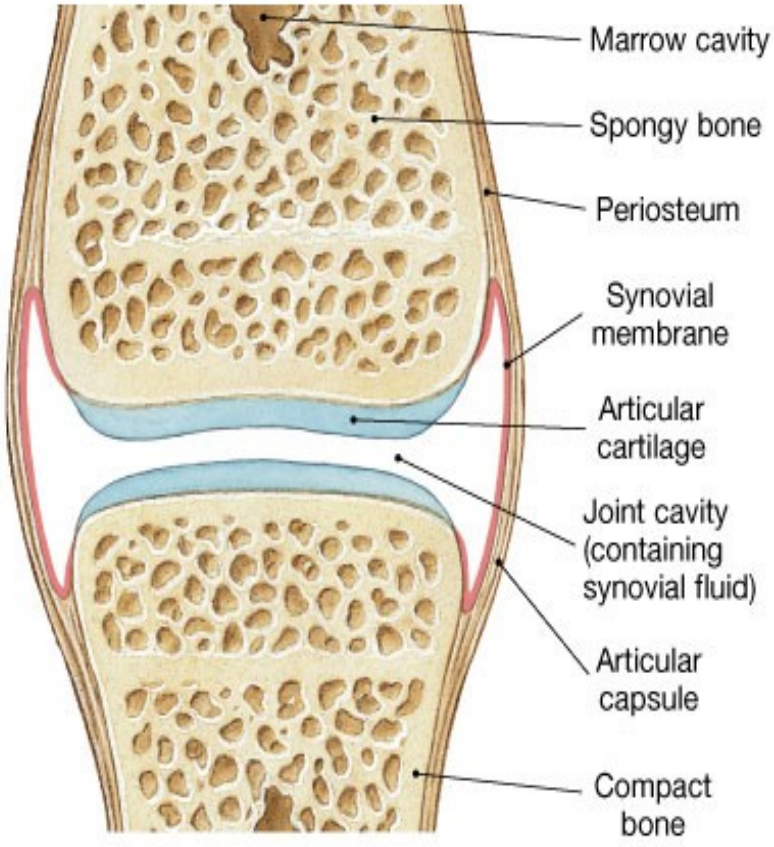
Symphysis – joined by Fibrocartilage



Pubic symphysis

Synovial Joints

Generalized Synovial Joint



Articular (joint) Capsule

- **Outer 'fibrous' layer** (dense irregular c.t.)
- **Inner 'cellular' layer** (synovial membrane)

Functional Classification of Articulations

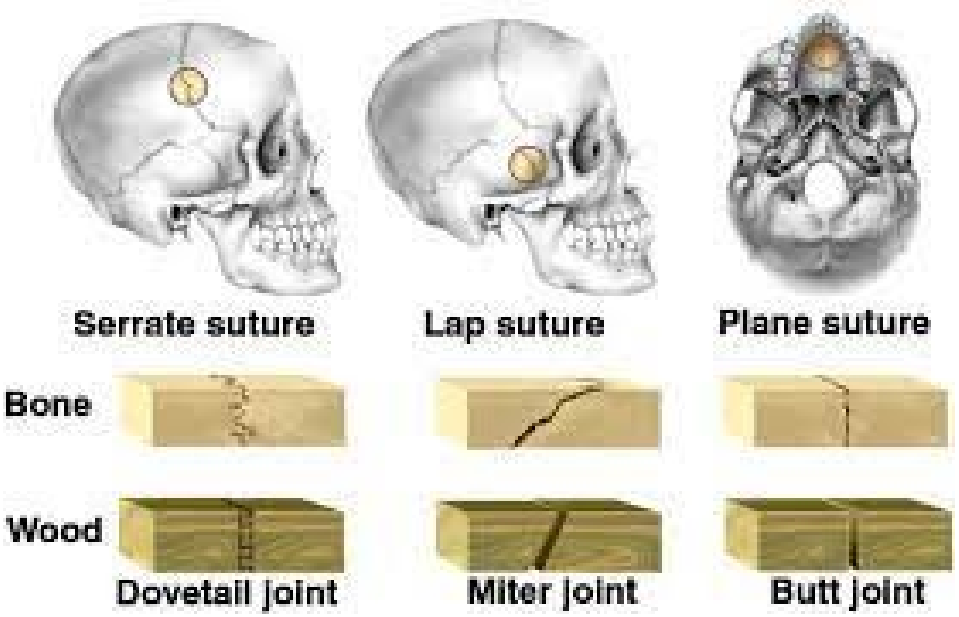
Degree of movement permitted at articulation:

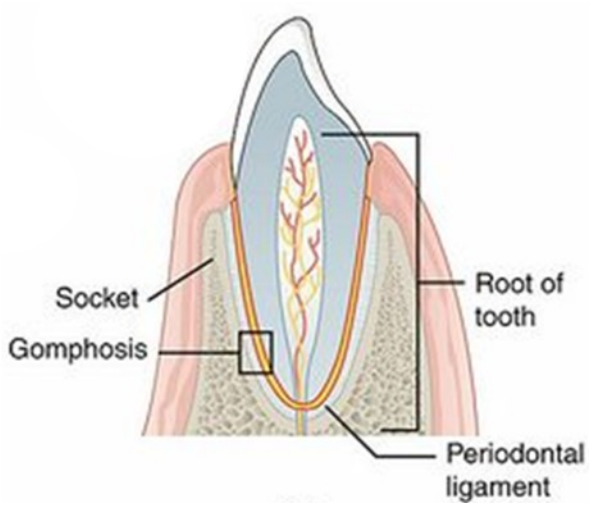
Ranges from: None, to a little bit, to highly movable.

1. **Synarthrosis** – no movement possible at these joints.
2. **Amphiarthrosis** – slight movement possible at joint.
3. **Diarthrosis** – highly moveable at these joints.

Synarthroses

Sutures – immovable joints of the skull **Gomphoses** – tooth in socket



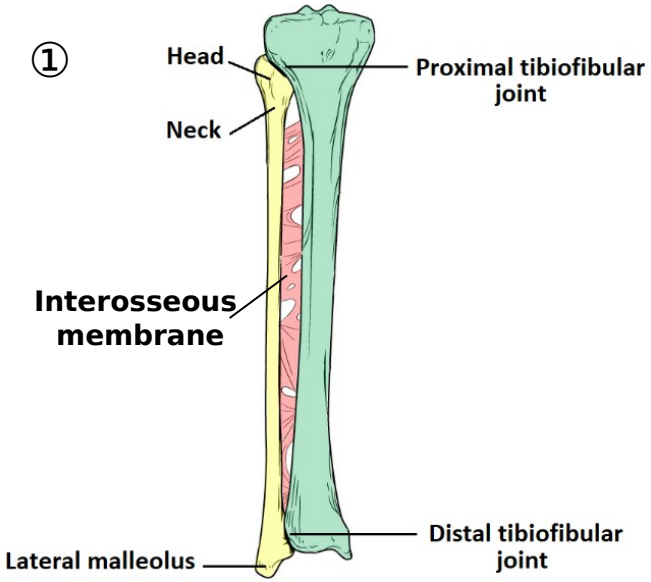


Amphiarthroses

Syndesmosis

Slightly movable fibrous joint.

①

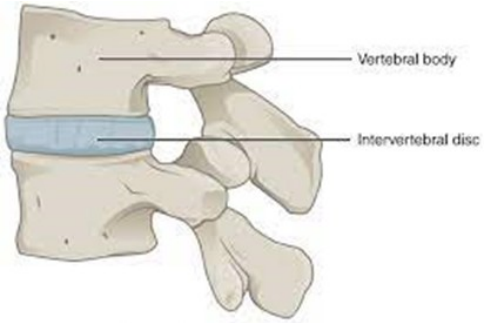


②

Symphysis

Slight movement with fibrocartilage

①



Cartilaginous joint uniting bodies
of adjacent vertebrae

②

Pubic symphysis of pelvic girdle

A syndesmosis is _____.

- the type of joint that unites bones of the skull
- the type of joint that anchors the teeth in the jaws
- a narrow fibrous joint
- a fibrous joint that unites parallel bones

Diarthroses

Joints characterized by their high mobility and having a joint cavity within a synovial membrane encased in the joint capsule.

Diarthrotic joints are also known as **Synovial joint**

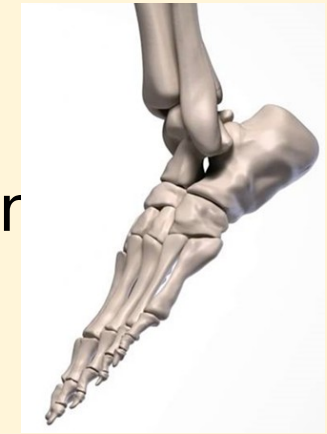
6 Types of Synovial Joints

- ***Gliding (Planar)***
- ***Hinge***
- ***Pivot***
- ***Ellipsoidal/ Condyloid***
- ***Saddle***
- ***Ball and Socket***

Gliding Joint

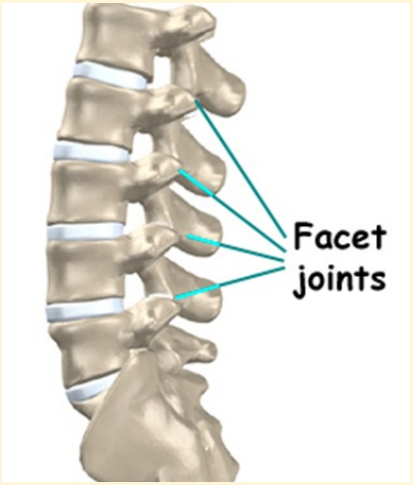
These joints occur as short boxy bone surfaces move past each other. See at wrist, ankles, and spine

Carpals of the hand **Intercarpal joints**



Tarsal joints
(navicular two cuneiforr
Intertarsal joints

Vertebral Column
Facets of intervertebral joints



Pivot Joint

1) Atlantoaxial joint

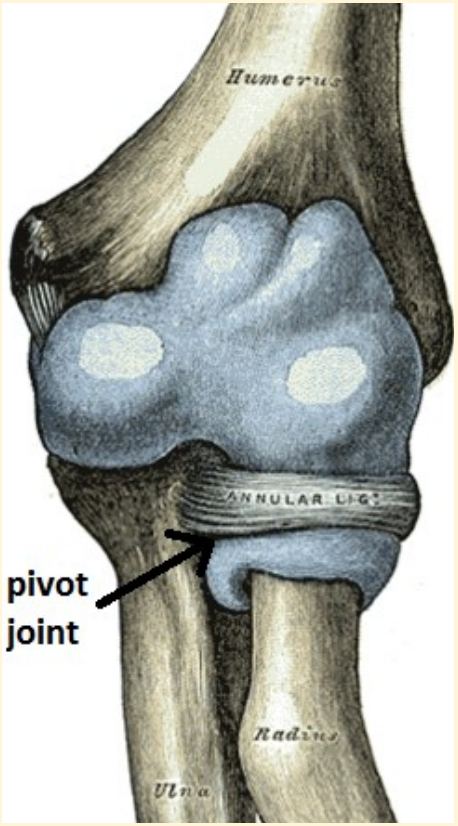
Formed between the **atlas** (C_1) and the **axis** (C_2) cervical vertebrae of

no" gesture,
head left to right.

2) Proximal radioulnar joint

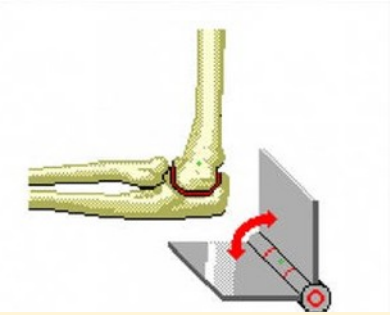
Consists of the **radial head** articulating with the **radial notch** of the **ulna**. The disc-like head of radius tightly bound by the **annular ligament** securing it in place.

Allows the pivot action of pronation/supination.

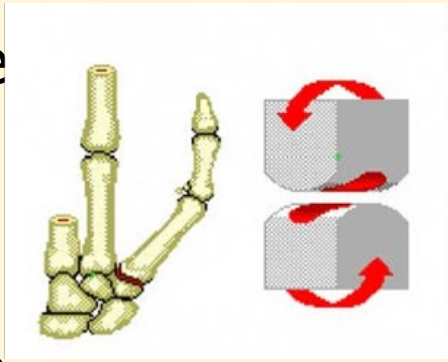


Hinge Joint

Humeroulnar joint of the elbo



Interphalangeal joints of the

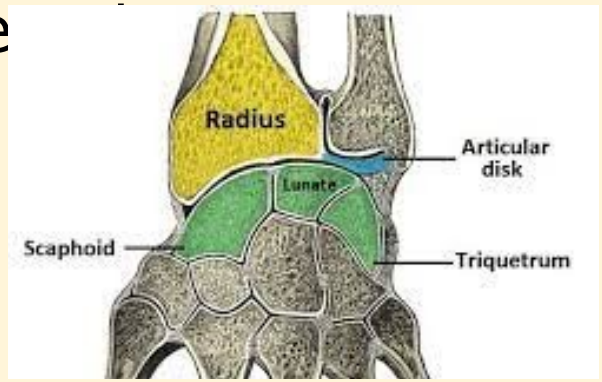


Tibiofemoral join of the knee.

Condyloid/Ellipsoid Joint

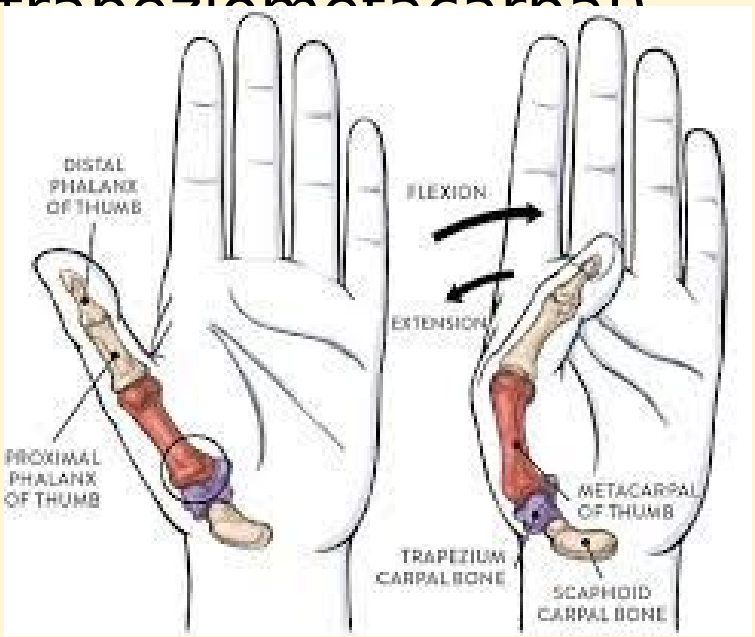
Metacarpophalangeal joints II through V.

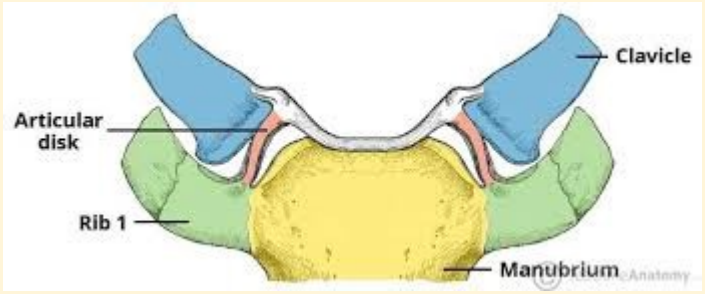
Distal radiocarpal joint of the



Saddle Joint

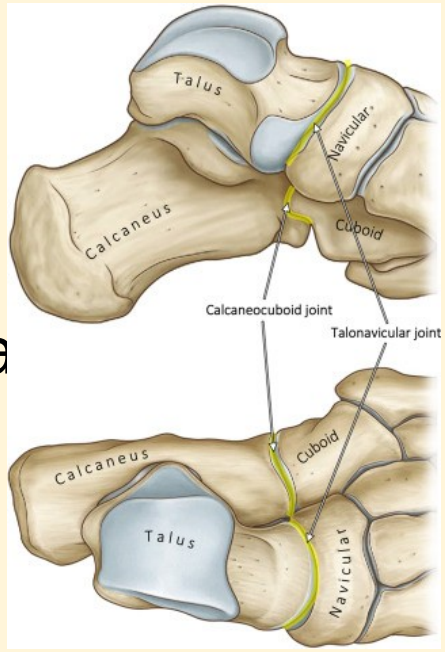
1st Carpometacarpal joint – the thumb joint (trapeziometacarpal)





Sternoclavicular joint of the thora

Calcaneocuboid joint of the heel

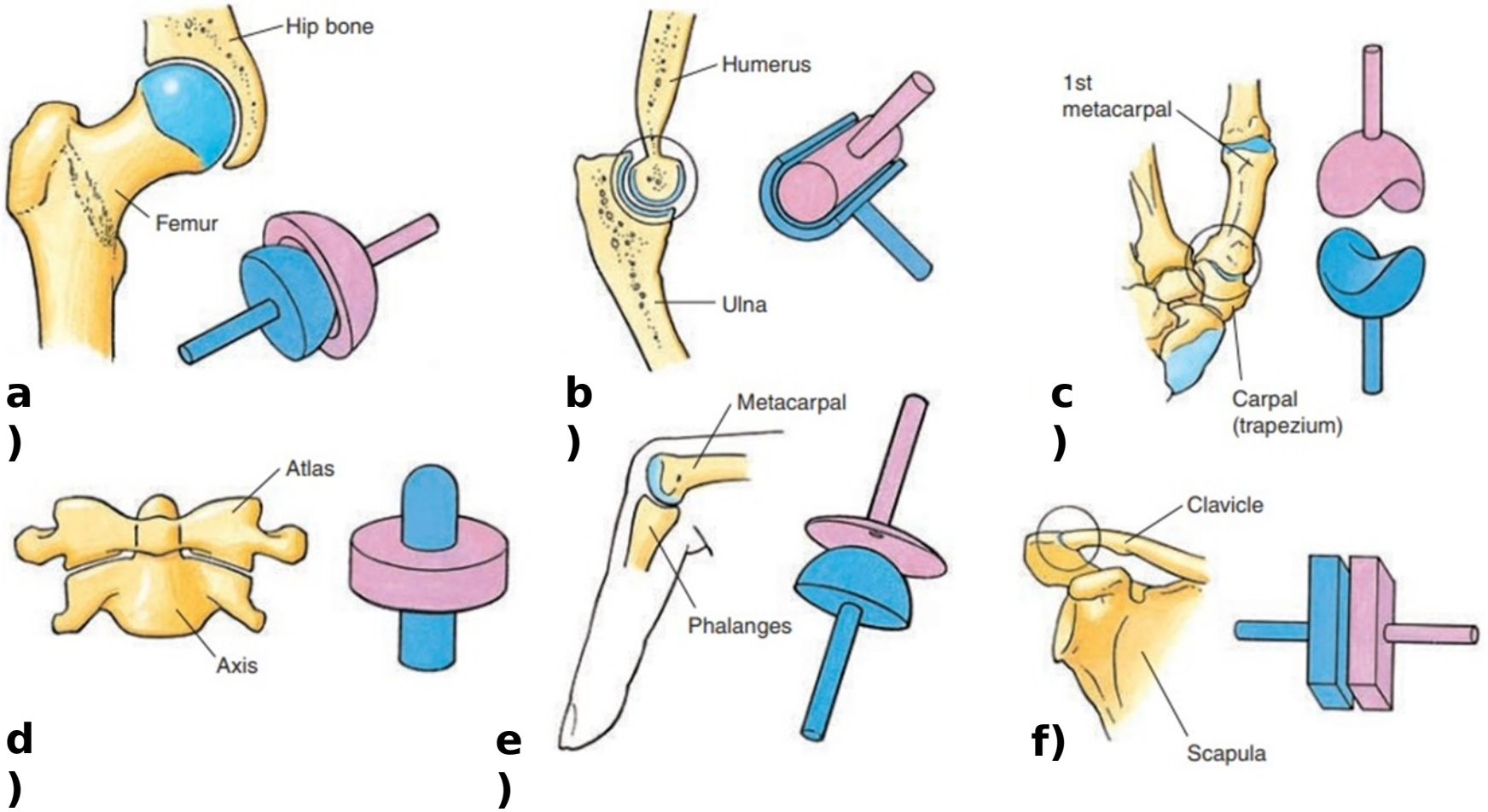


Ball and Socket Joint

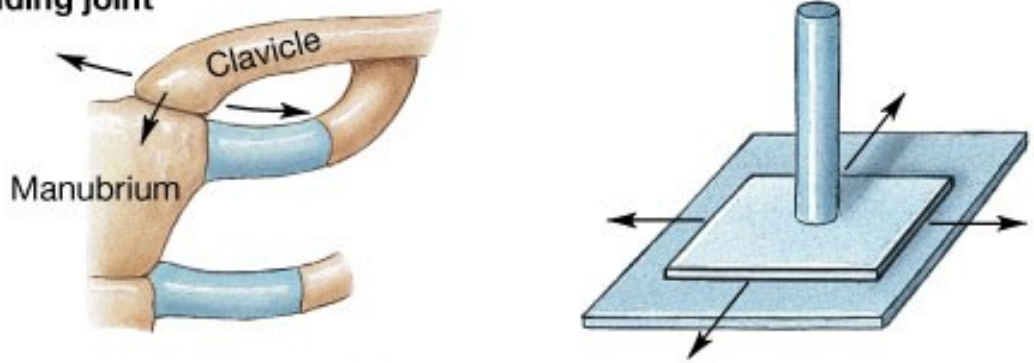
Hip joint of the pelvic girdle

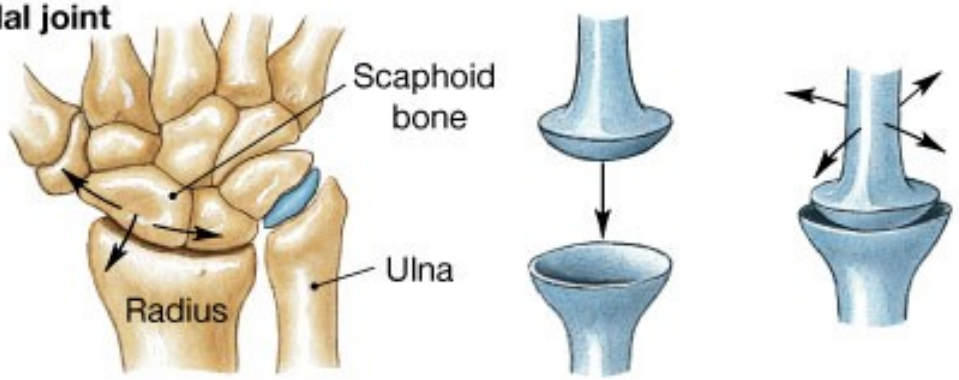
Shoulder joint of pectoral girdle

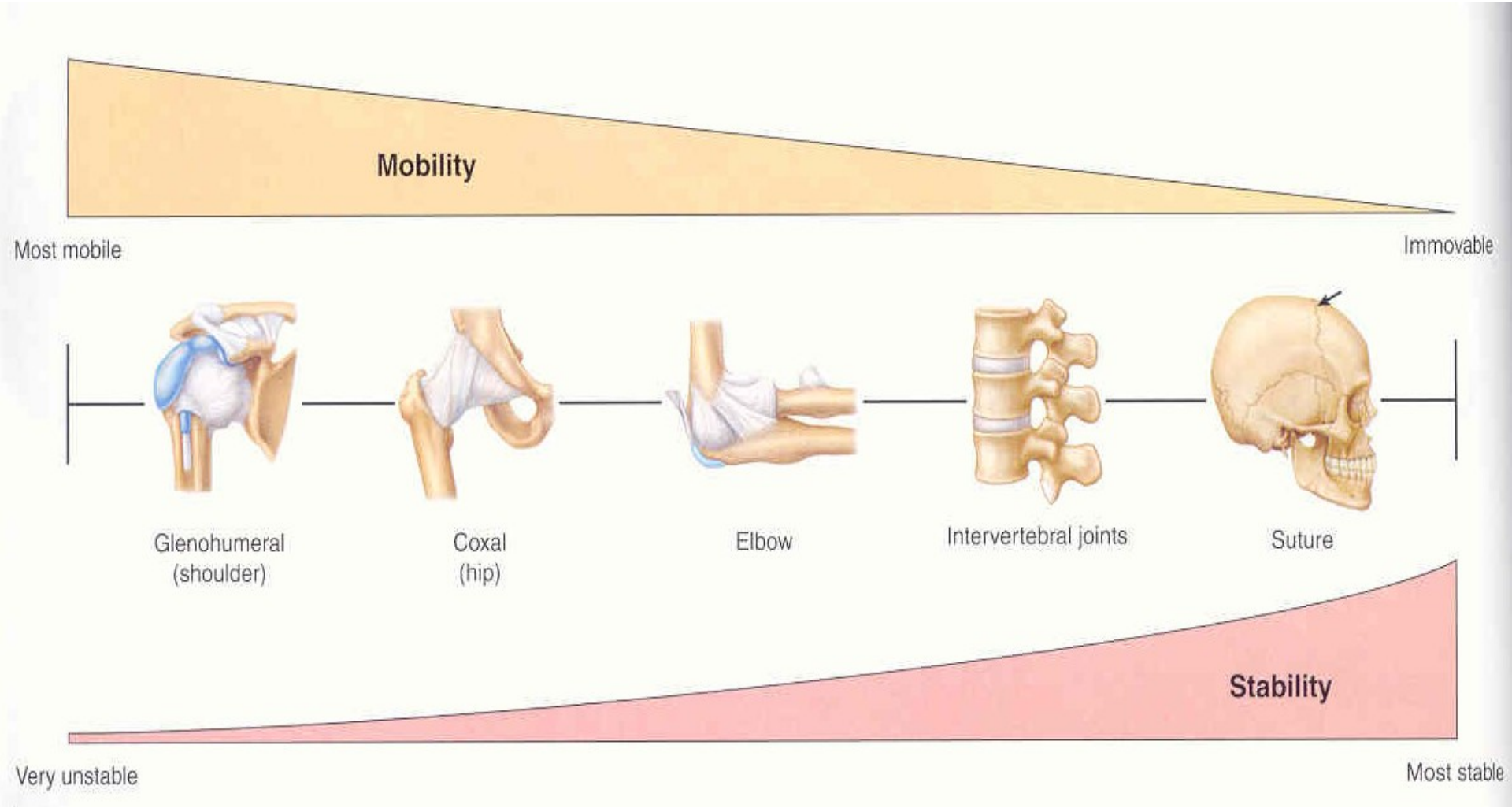
The 6 Types of Synovial Joints



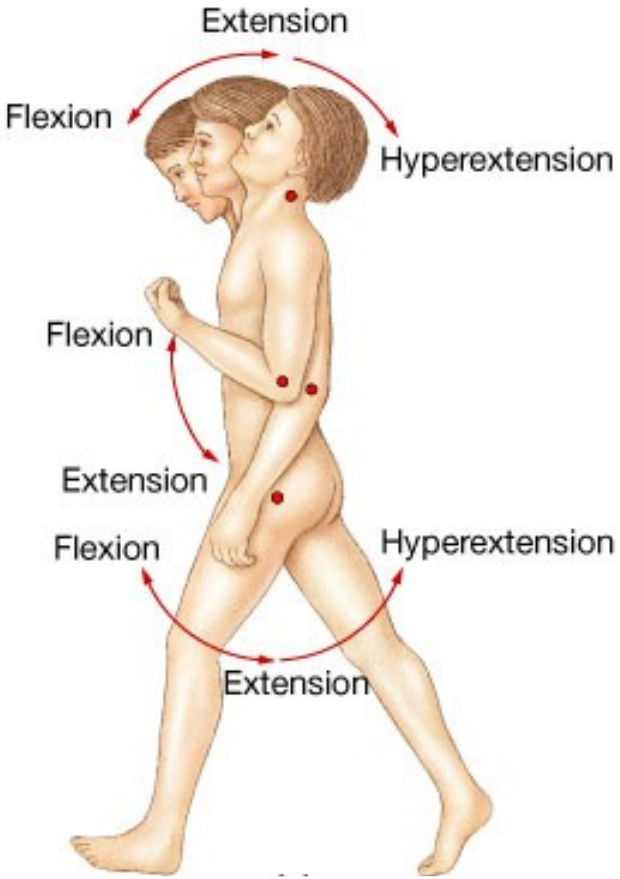
a) Ball and Socket; **b)** Hinge; **c)** Saddle; **d)** Pivot; **e)** Ellipsoidal/Condyloid; **f)** Gliding (Planar).

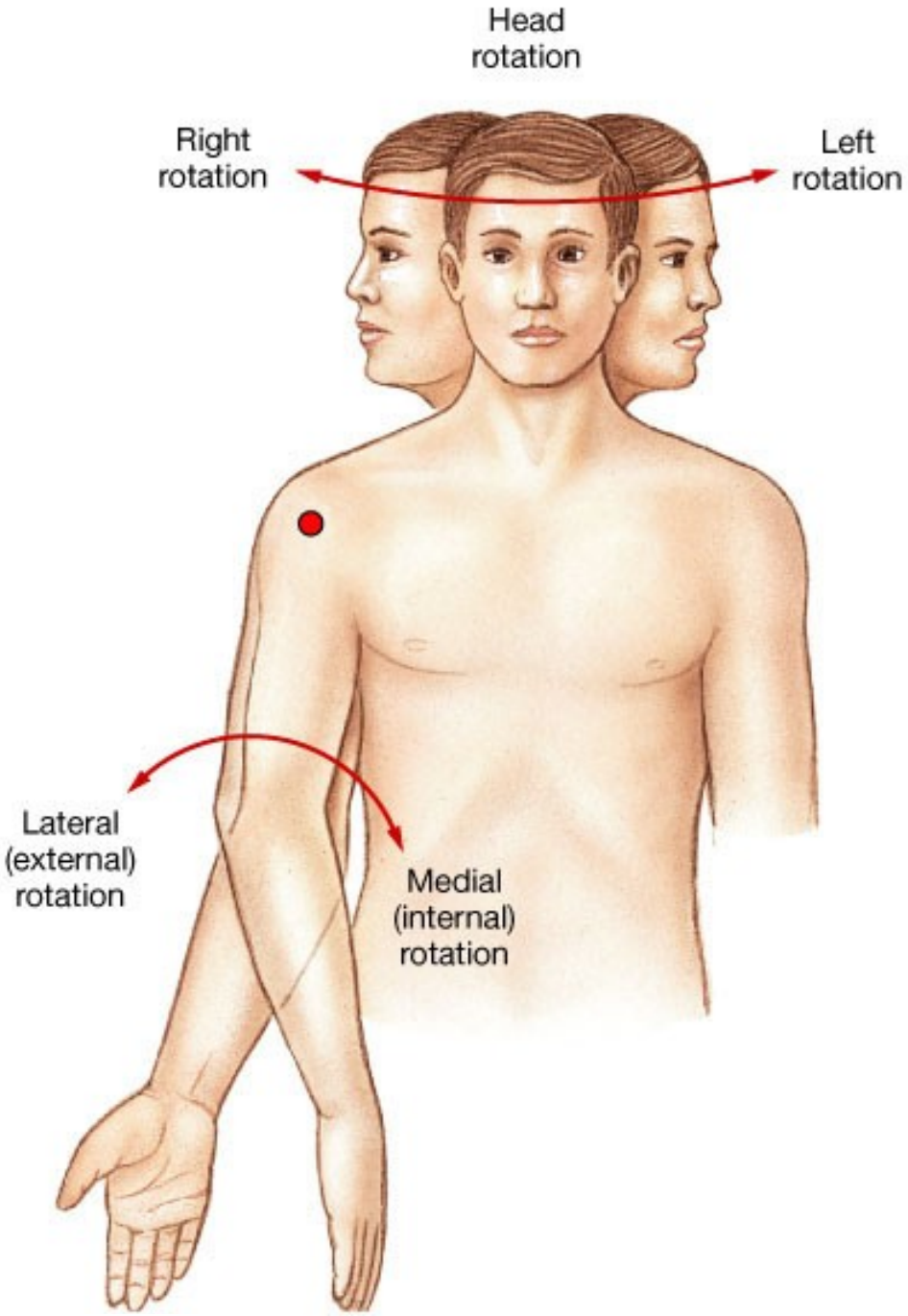
Types of Synovial Joints	Movement	Examples
Gliding joint 	Slight nonaxial or multiaxial	**Sternoclavicular joint** **Intercarpal and Intertarsal joints**
		Elbow joint **Knee joint** **Ankle joint** **Interphalangeal joints**
		Atlantoaxial joint **Proximal Radioulnar Joint (*pronate/ supinate*)**

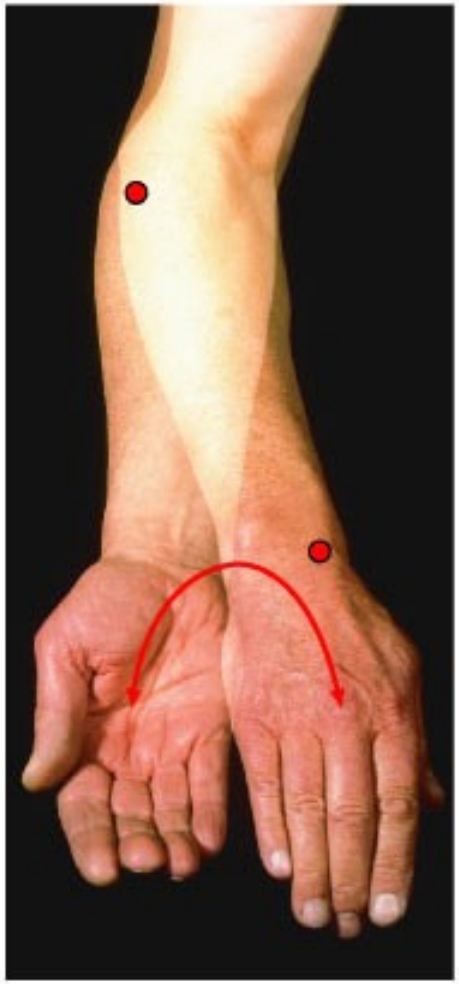
Types of Synovial Joints	Movement	Examples
Ellipsoidal joint 	Biaxial	Radiocarpal Joint Metacarpophalangeal Joints (2-5)
		Trapeziometacarpal Joint (1st carpometacarpal)
		Hip joint Shoulder joint


Mobility
Most mobile
Immovable
Glenohumeral (shoulder)
Coxal (hip)
Elbow
Intervertebral joints
Suture
Stability
Very unstable
Most stable

Movements (**Actions**) at Articulations

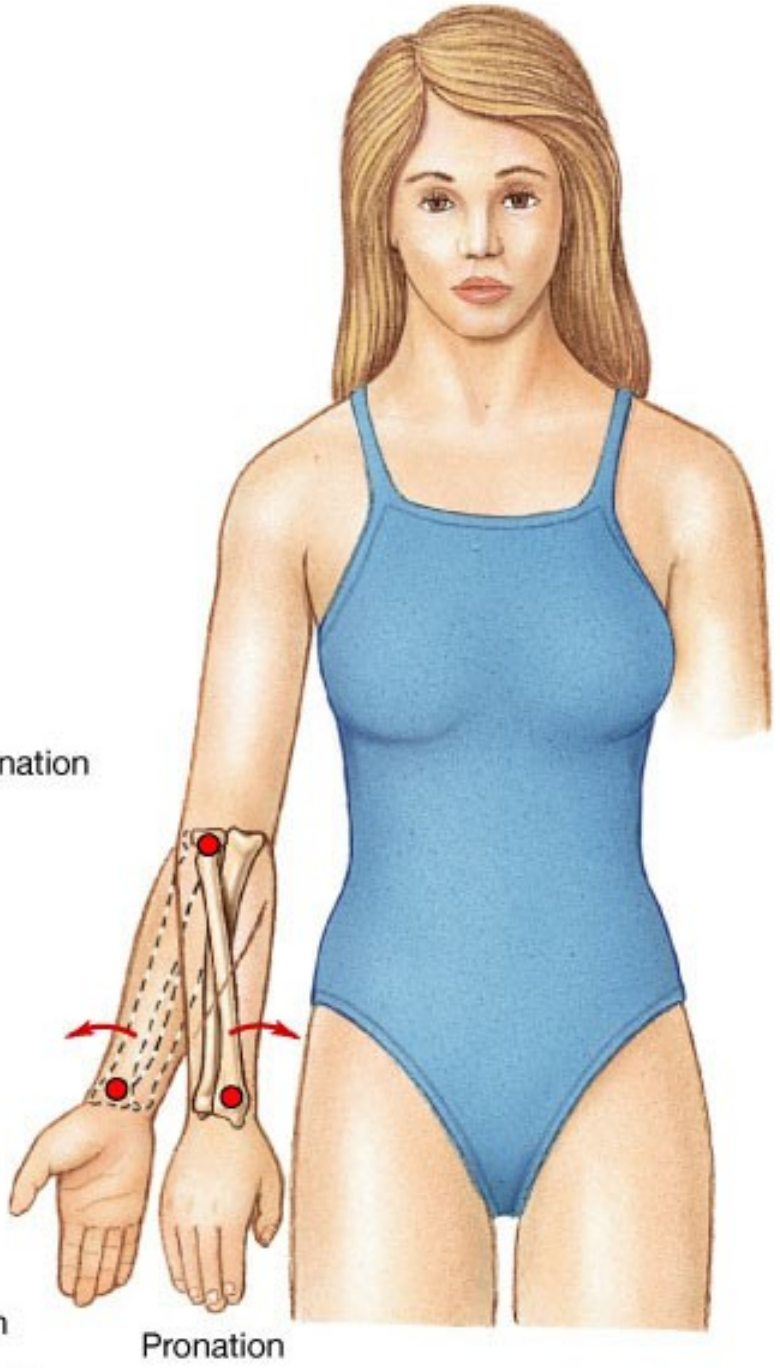



Head
rotation
Right
rotation
Left
rotation
Lateral
(external)
rotation
Medial
(internal)
rotation



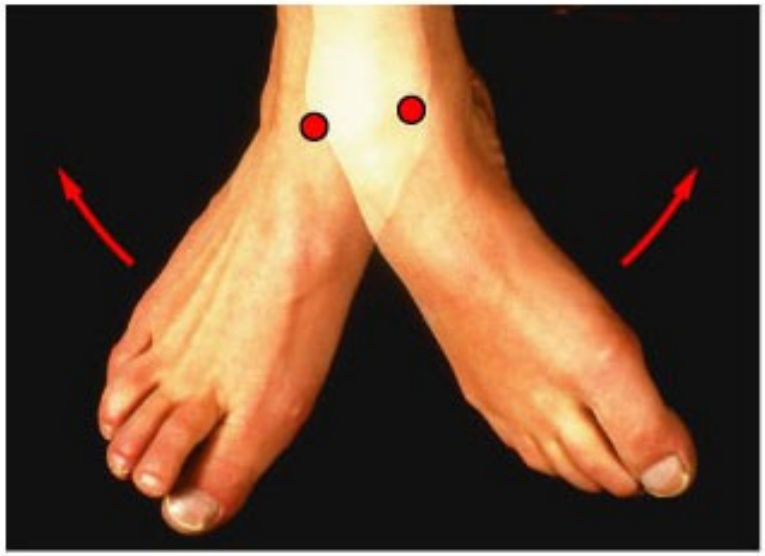
Supination

Pronation



Supination

Pronation



Eversion Inversion

tructures that Stabilize Synovial Joints

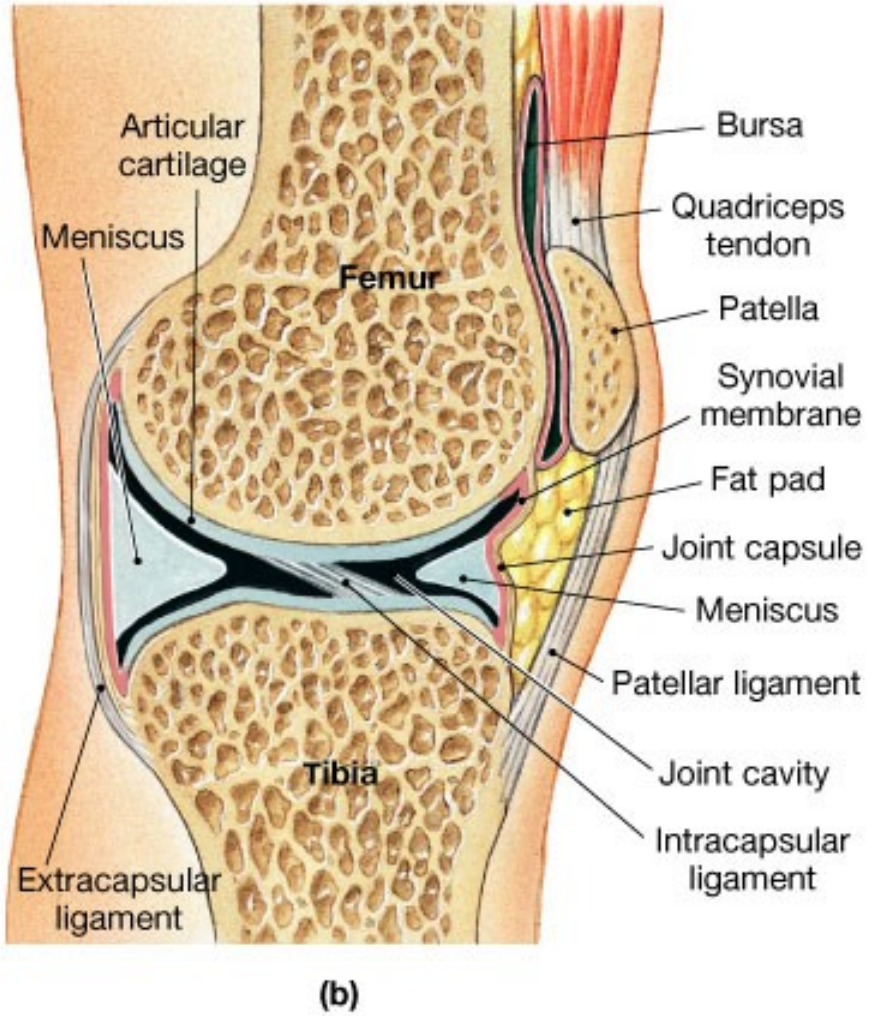
Ligaments

Menisci

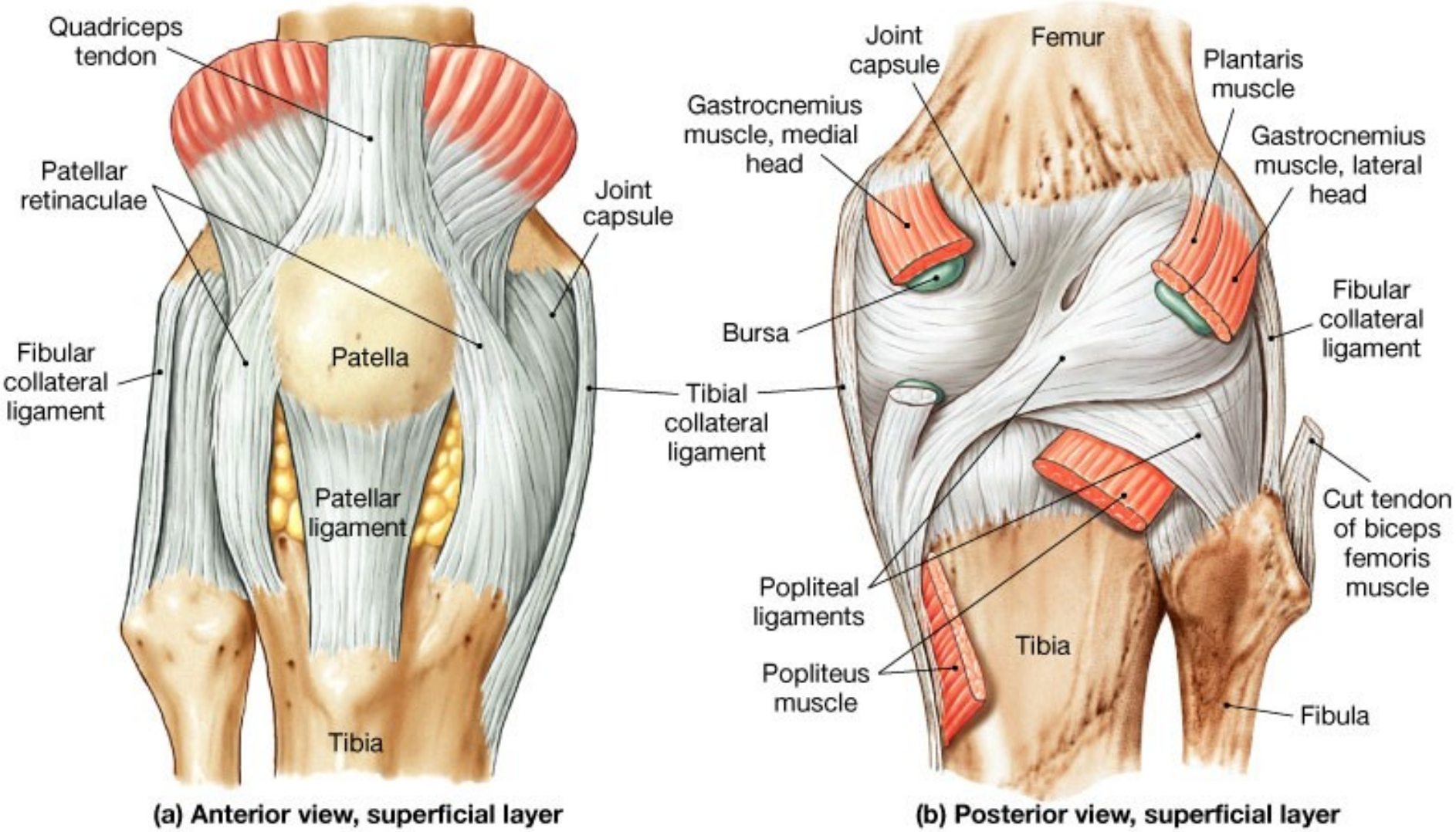
Bursae

Fat pads

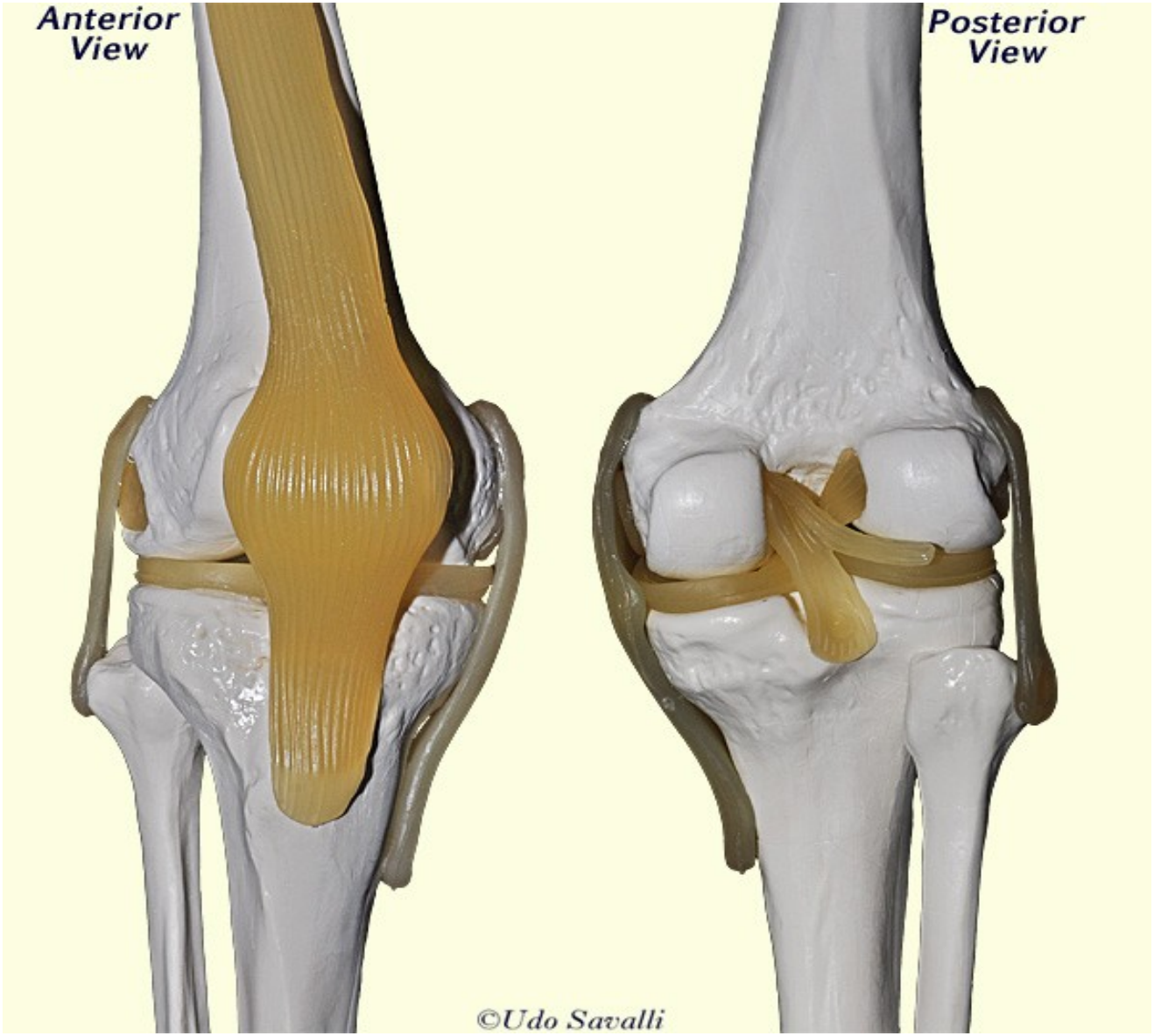
Tendons



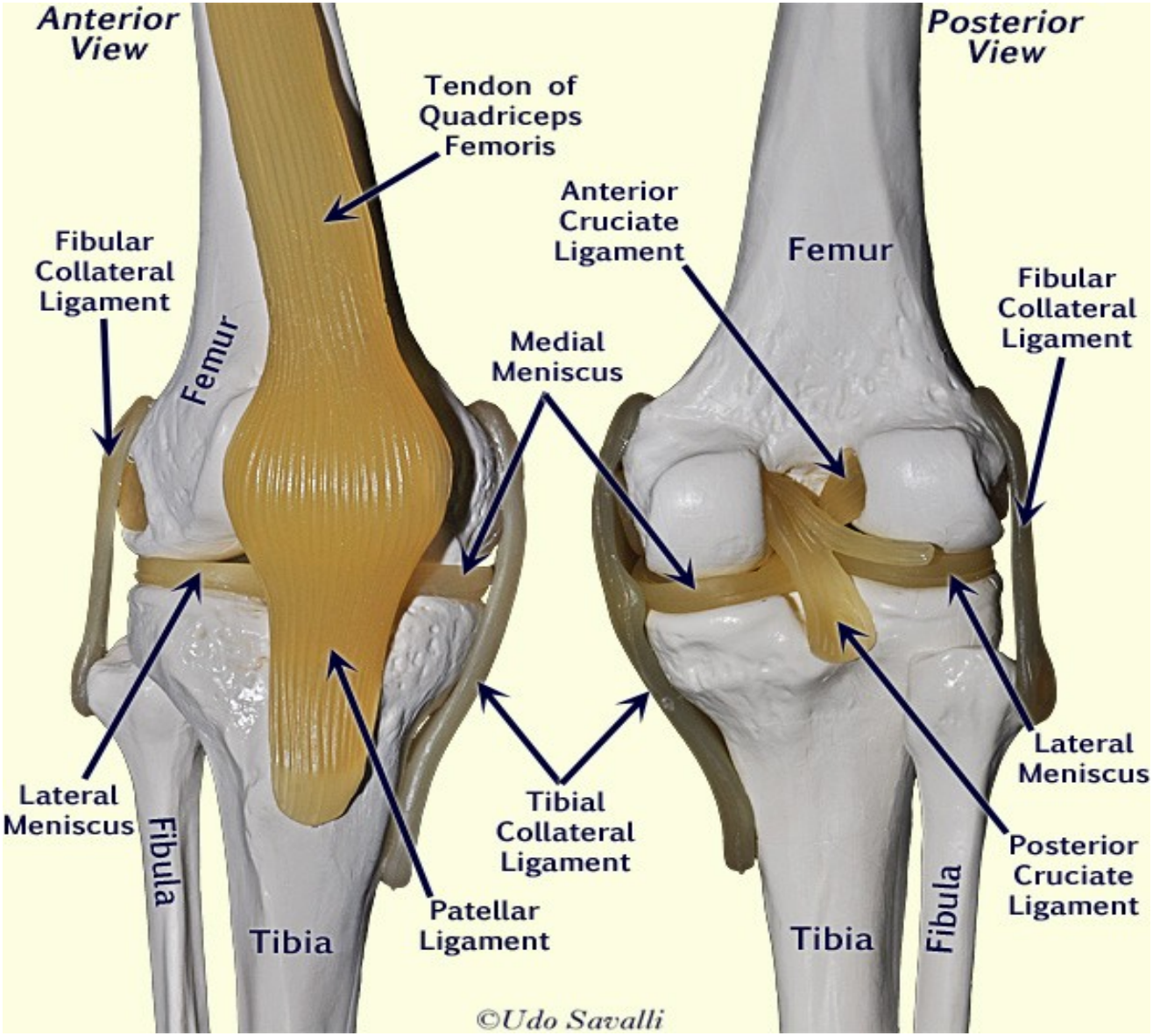
Diagrammatic Knee Joint

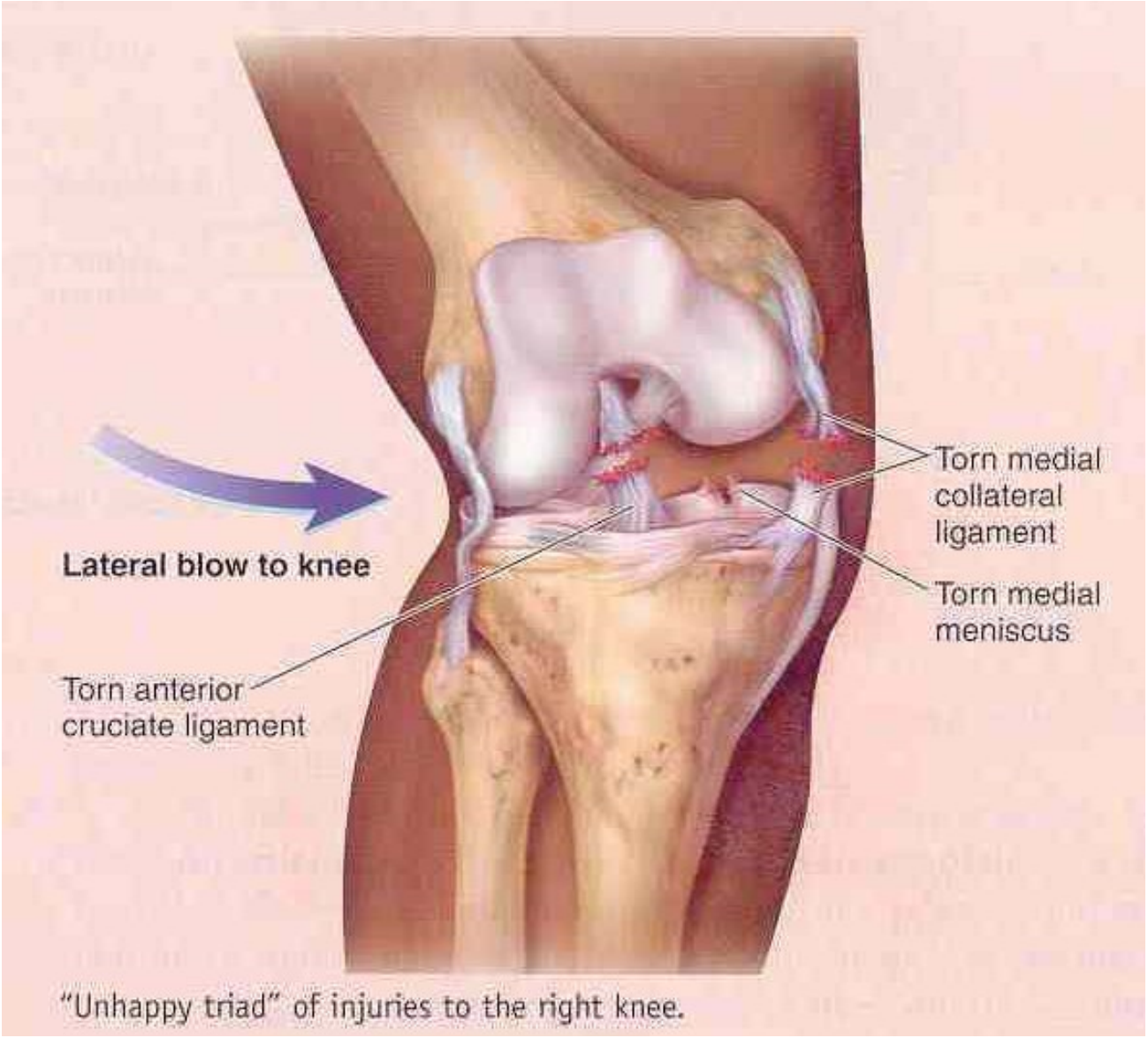


The Knee Joint

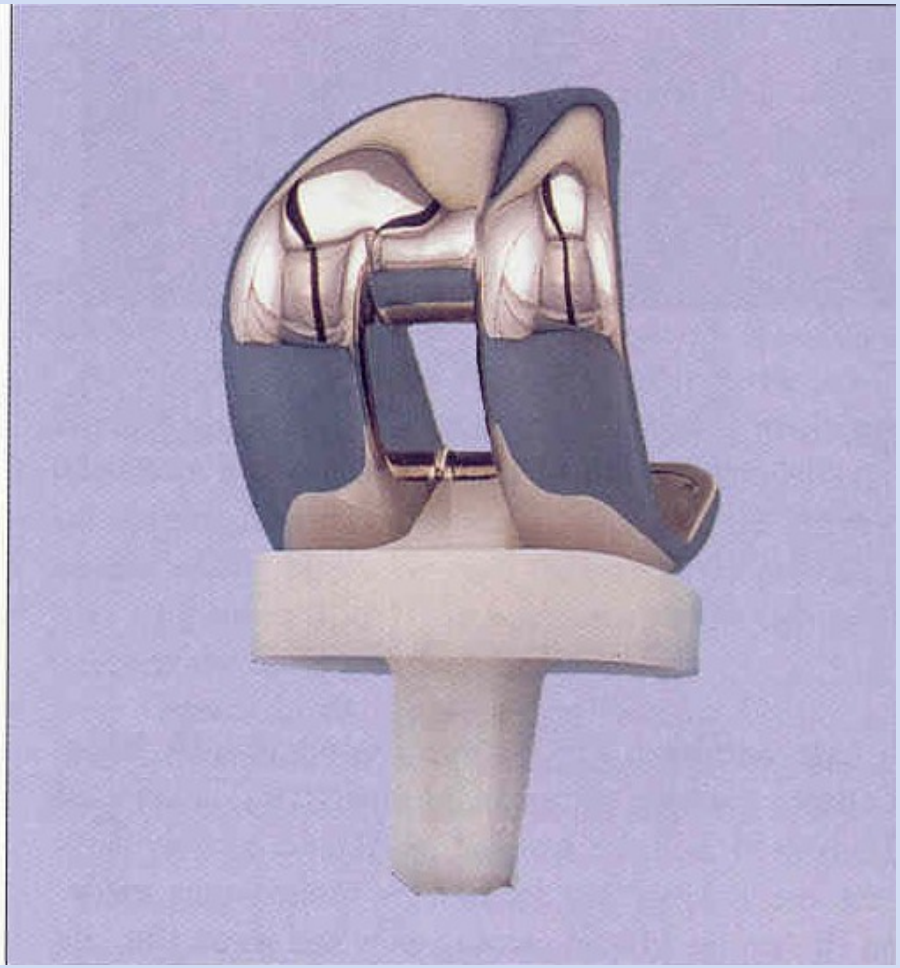


The Knee Joint



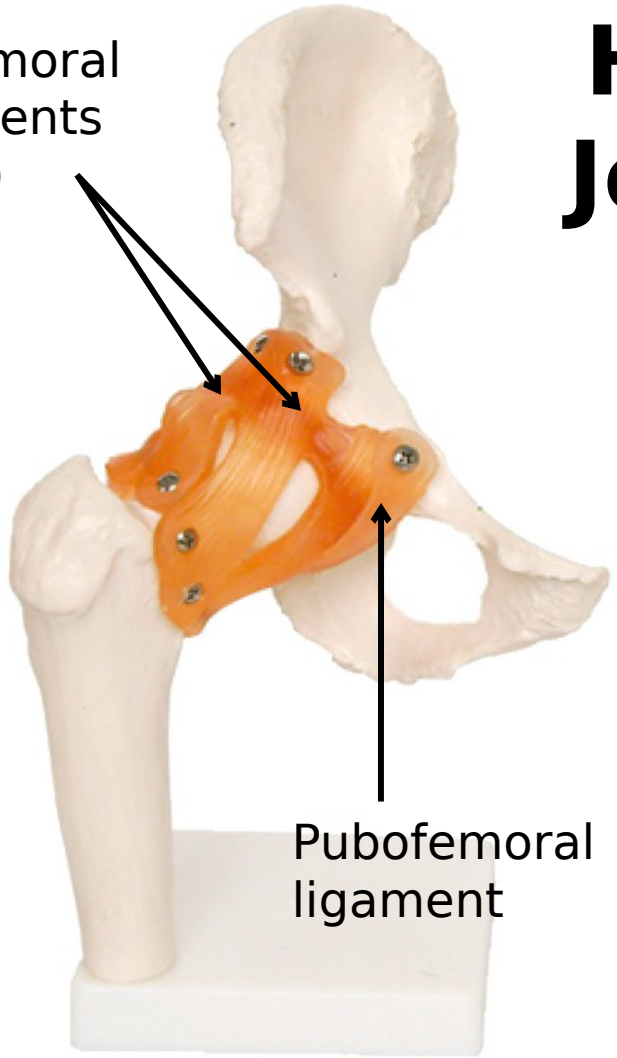


"Unhappy triad" of injuries to the right knee.



The Hip Joint

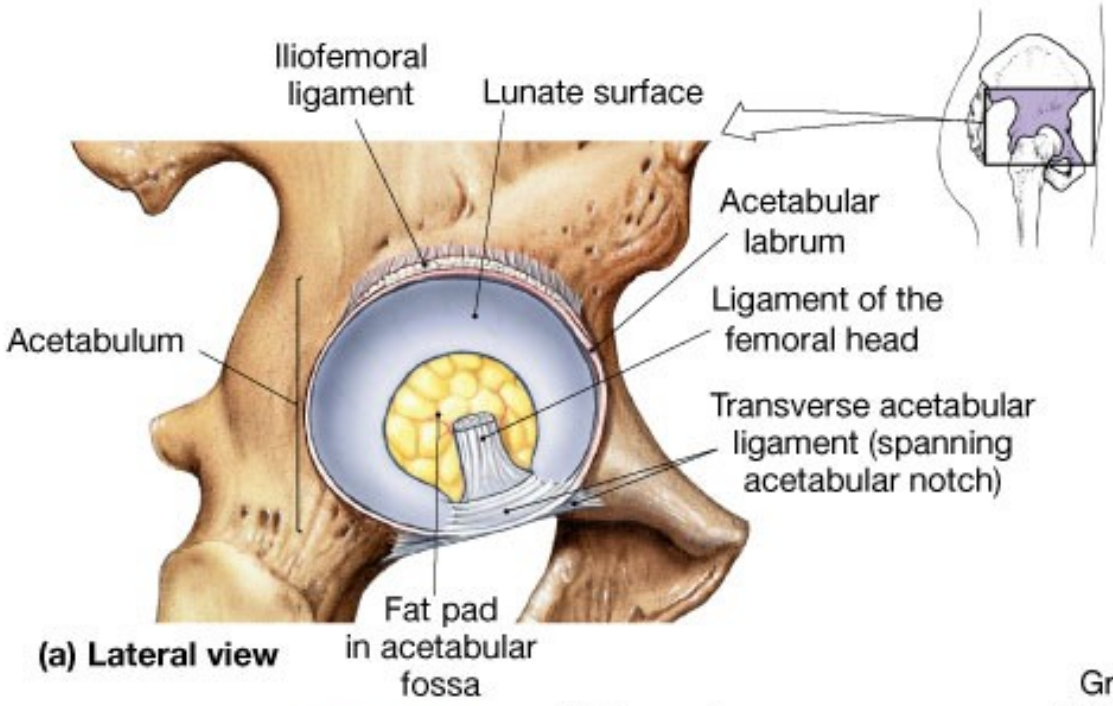
Plus the don't forget the **ligamentum teres** connecting the fovea capitis to the acetabulum



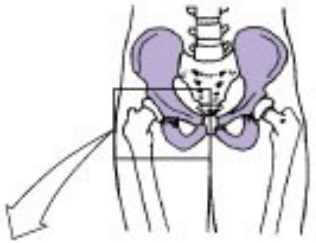
Pattern: 1st part = name of bone ligament is coming from on os coxa (3 choices).

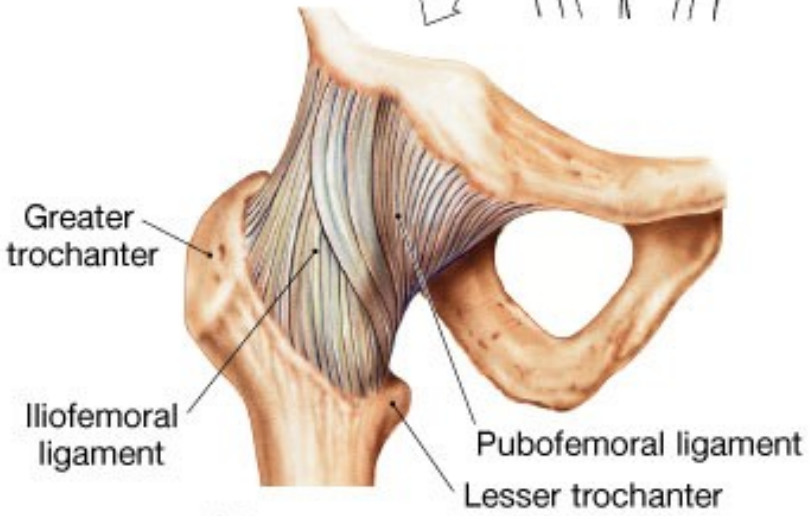
2nd part = femoral.

Hip Joint

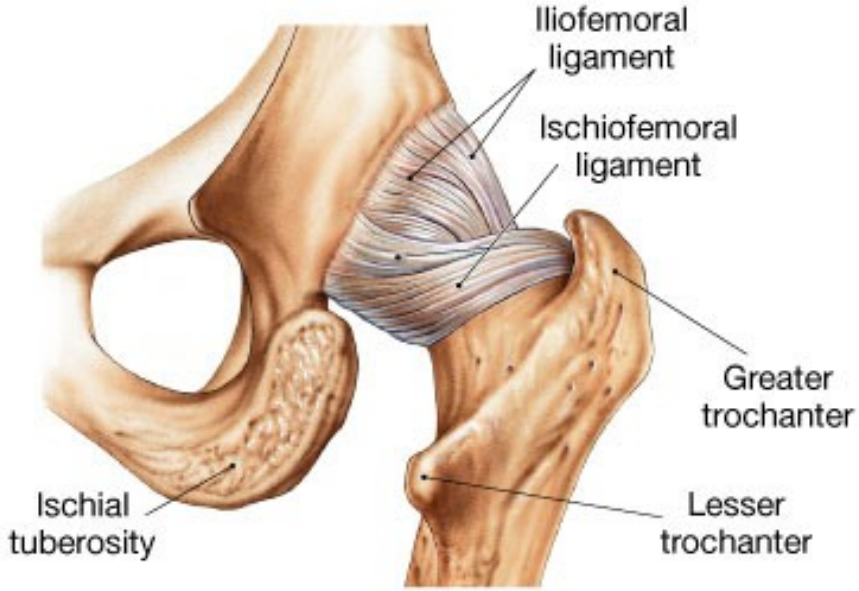


(a) Lateral view



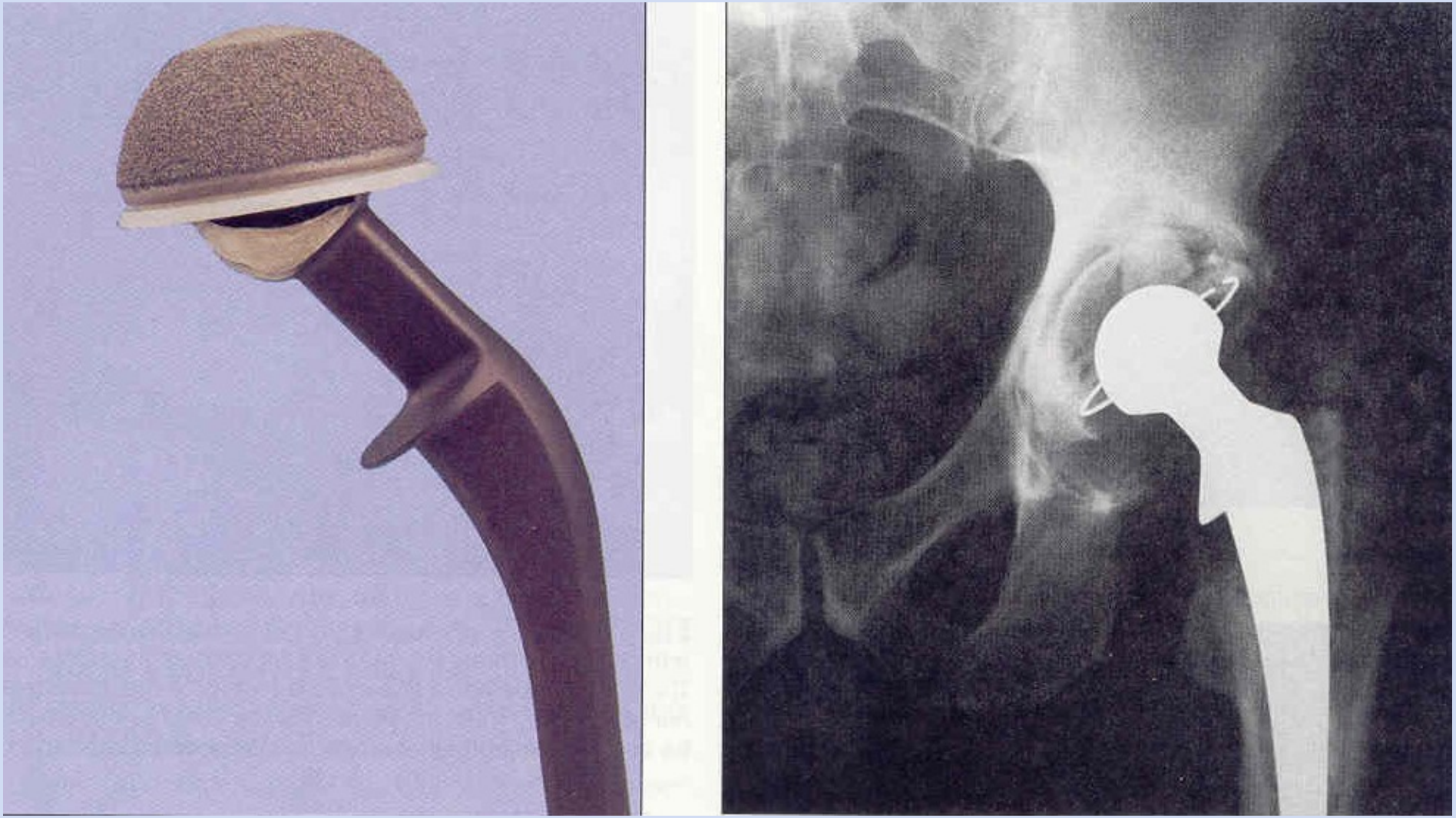


(b) Anterior view



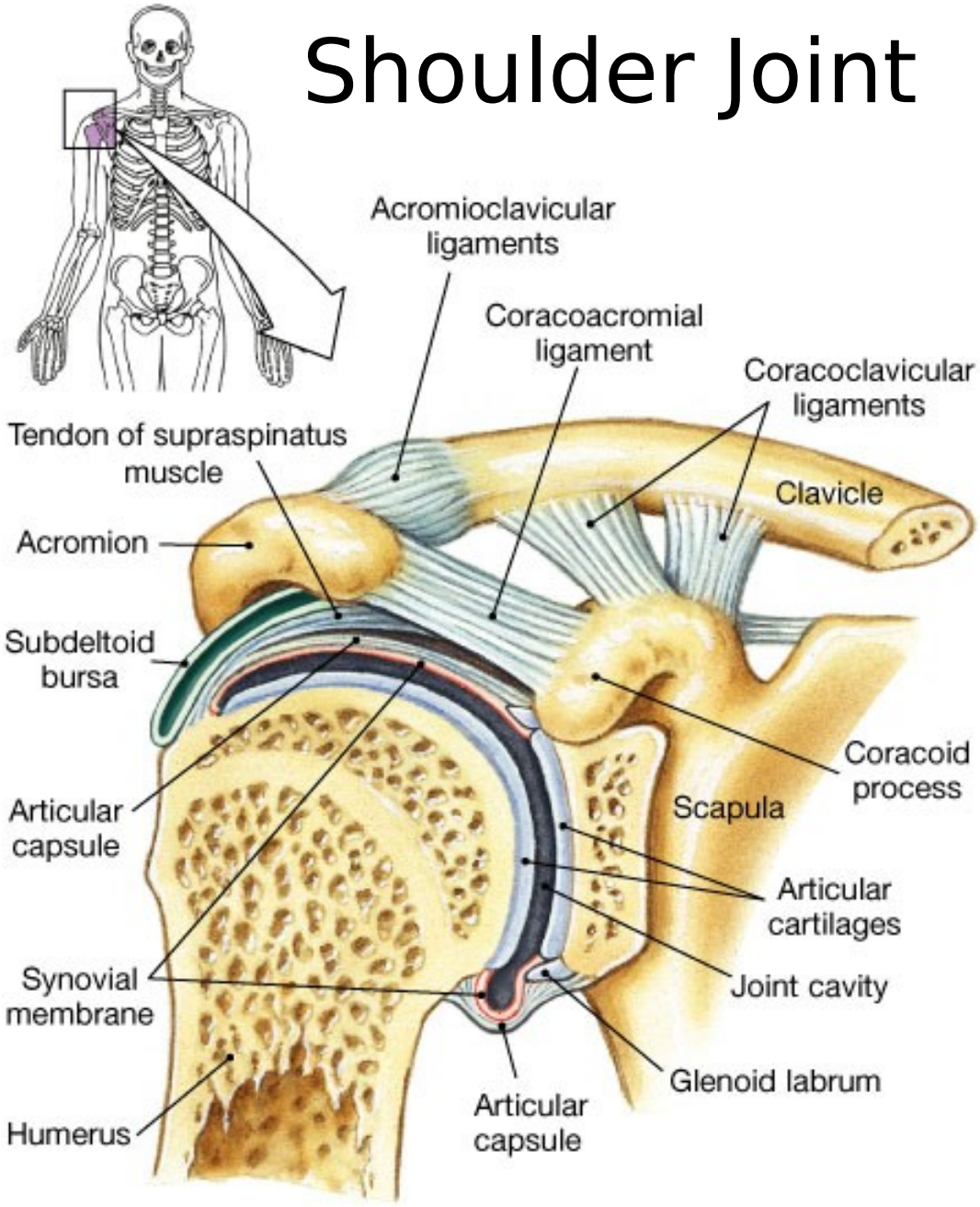
(c) Posterior view

Hip Fracture’ is the breaking of which structure? _____



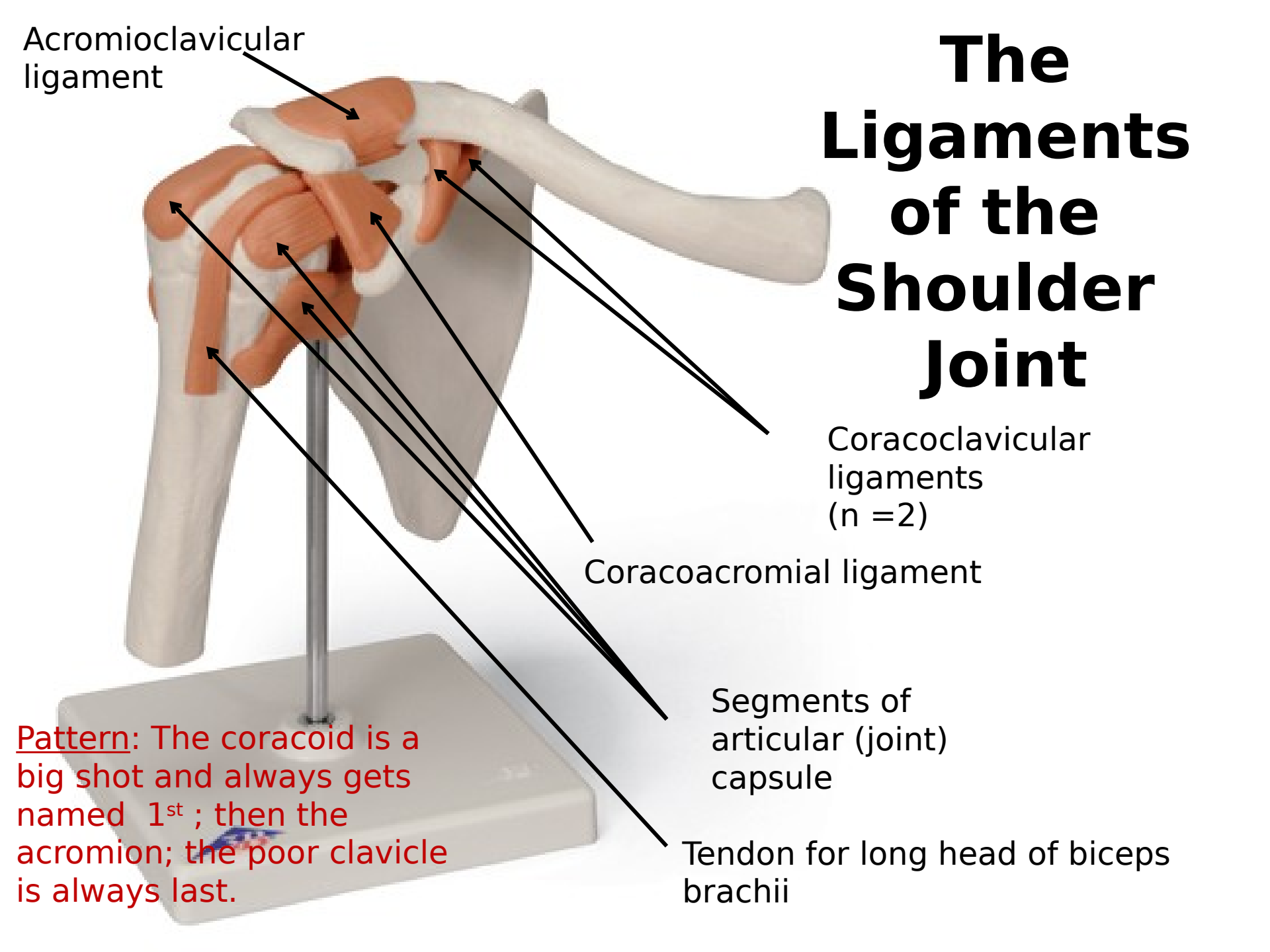
Hip Replacement Procedure

Shoulder Joint



(a) Anterior view, frontal section

The Ligaments of the Shoulder Joint


Acromioclavicular ligament
Coracoclavicular ligaments (n =2)
Coracoacromial ligament
Segments of articular (joint) capsule
Tendon for long head of biceps brachii

Pattern: The coracoid is a big shot and always gets named 1st ; then the acromion; the poor clavicle is always last.

Hands with rheumatoid arthritis.

Disorders of Articulations

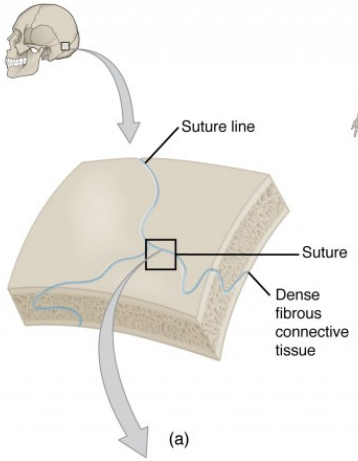
- **Arthritis**: Inflammation of a synovial joint, that is often painful and restricts movement at that joint.
- **Osteoarthritis**: “Wear and tear” age-related arthritis, due to use of the joint.

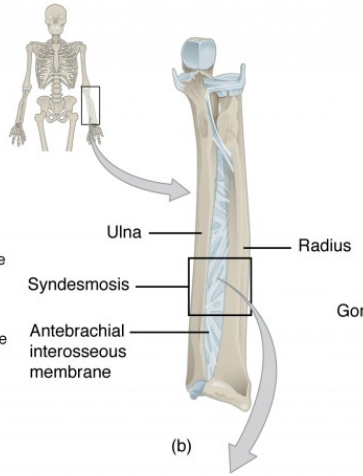
- **Rheumatoid Arthritis**: Autoimmune disease, in which the body’s defense cells attack synovial joints.
- **Ankylosis**: Abnormal fusion of a joint, restricting normal movement.

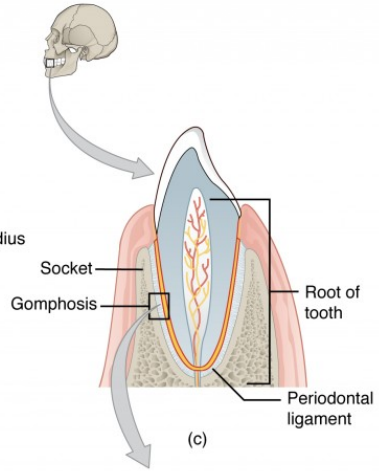
Disorders of Articulations

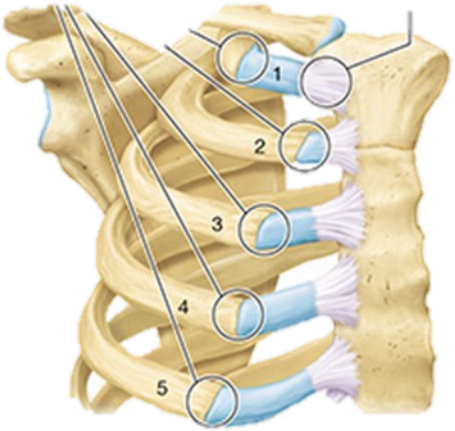
- **Bursitis**: Inflammation of a bursa, causing pain when ever the associated ligament or tendon moves.
- **Gout (Gouty Arthritis)**: Uric acid deposits in synovial joints and crystallizes there, causing pain and restricting movement.

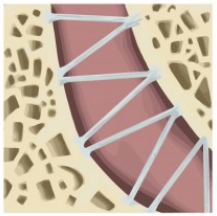
- **Sprain**: When a ligament is stretched beyond normal, to where some collagen fibers are torn.
- **Luxation**: Dislocation, when articulating surfaces are forced out of anatomical position.

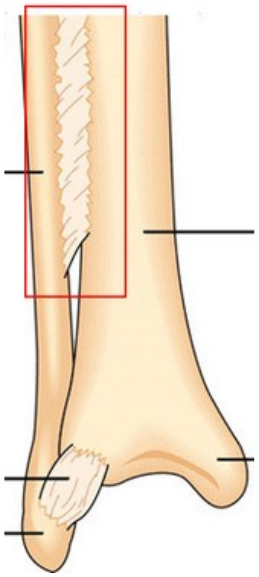

Suture line
Suture
Dense fibrous connective tissue
(a)

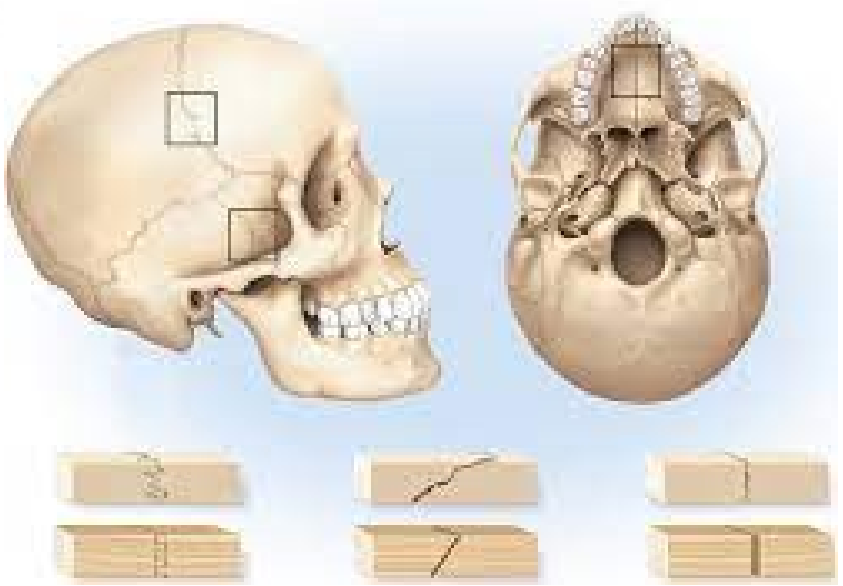

Ulna
Radius
Syndesmosis
Antebrachial interosseous membrane
(b)


Socket
Gomphosis
Root of tooth
Periodontal ligament
(c)


1
2
3
4
5







The 6 Types of Synovial Joints